

GALL STONES

Cholelithiasis

* Incidence ::

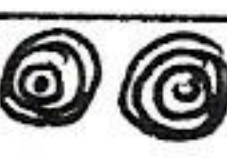
- GBS are a common disease, present in 10% of population over 40 yrs (Fatty, Filthy, Fertile, Female, > Forty yrs)
or (Fare)

(exception of this rule is too frequent)

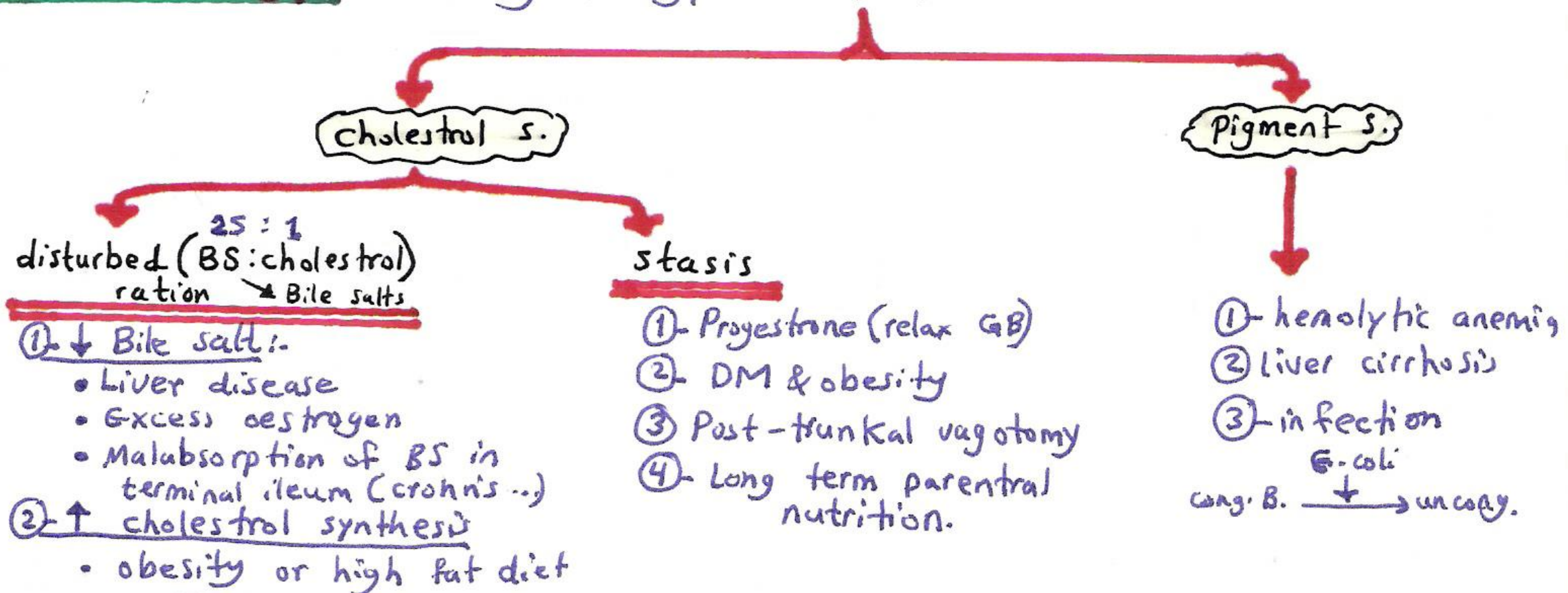
* Types of stones ::

- (A) Old classification:-
- 1- Mixed stone (80%)
 - 2- Cholesterol stone (10%)
 - 3- pigment stone (8%)
 - 4- Ca. carbonate (2%)

(B) New classification:-

	Cholesterol stones (97%)		Pigment stones (3%)	
	Mixed 90%	Pure 7%	black	brown
composition	cholesterol + Ca bilirubinate & palmitat	cholesterol only	Ca bilirubinate	<20% cholesterol + Ca bilirubinate & palmitat
No. & size	multiple < 2.5 cm	Single > 2.5 cm	Multiple < 2.5	multiple < 2.5
shape	facetated 	Mamillated 	spicules 	laminated 
X-ray	radio-opaque 15%	radiolucent	radioopaque 50%	radioopaque

* Aetiology :: according to type of stone



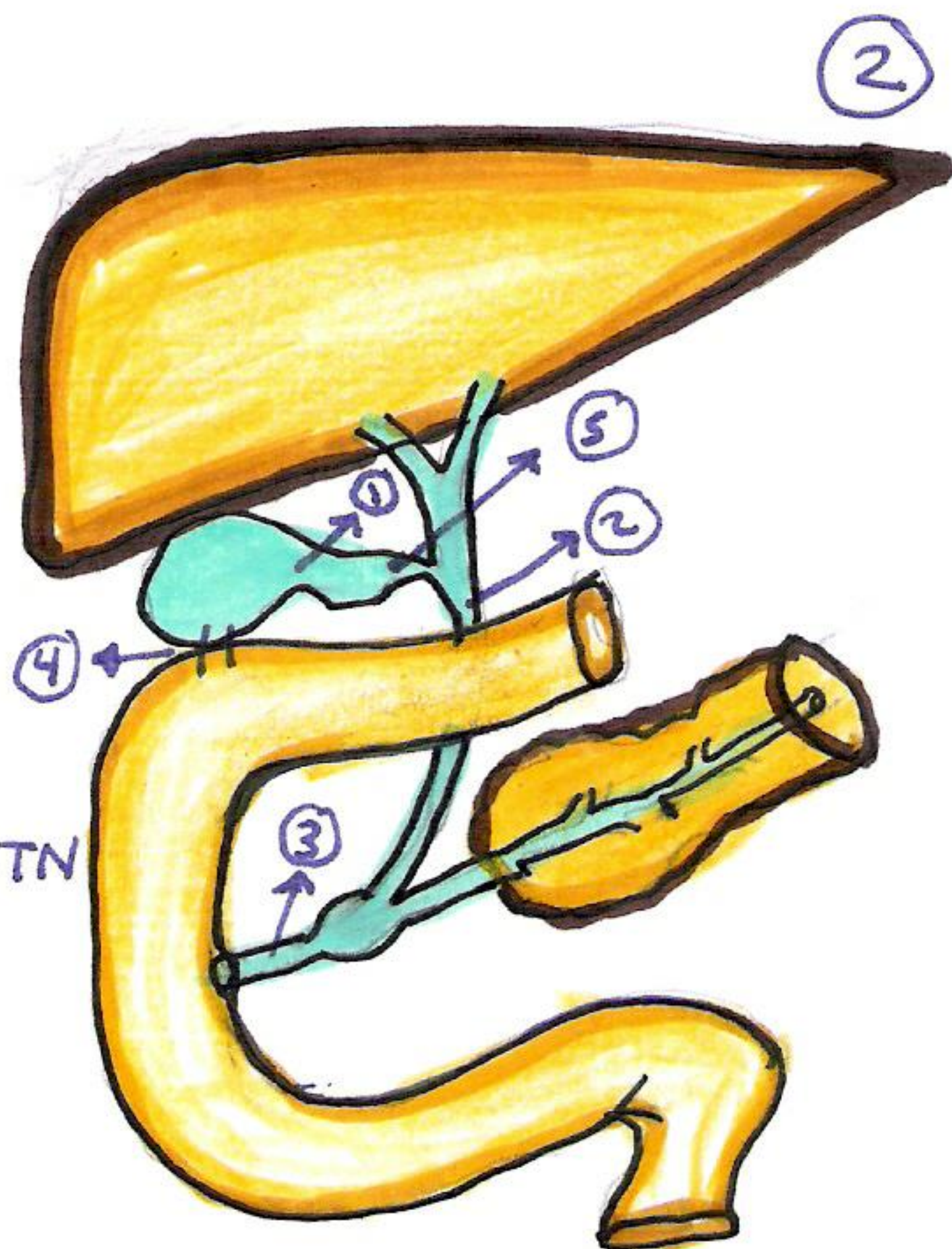
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* Effect & Complications of GBS :-

(I) Obstructive Complications:-

- ① Obstruction of cystic duct → Mucocele or empyema of GB.
- ② obst. of CBD → obst. jaundice and 2nd biliary cirrhosis → ^{liver cell failure} LCF, Portal HTN
- ③ obst. of ampulla of Vater → ^{acute} Pancreatitis
- ④ obst. of terminal ileum → Gall stone ileus (rare) :- due to fistula between GB & duodenum by large stone
- ⑤ Mirizzi syndrome (rare) :- due to stone in Hartmann's Pouch → partial obst. of common ^{CHD} hepatic duct → erosion of CHD forming single cavity → obst. jaundice.
N.B :- in Mirizzi syndrome CHD may be mistaken for cystic duct and ligated.



(II) Infective:-

- ① - acute & chronic calculous cholecystitis.
- ② - Ascending cholangitis & Liver abscess.

(III) Ulcerative:-

- ① fistula :- internal (duodenum...etc) or external (skin)/Perforation GB
- ② Peptic ulcer due to reflex pylorospasm & gastric stasis.

(IV) Neoplastic:-

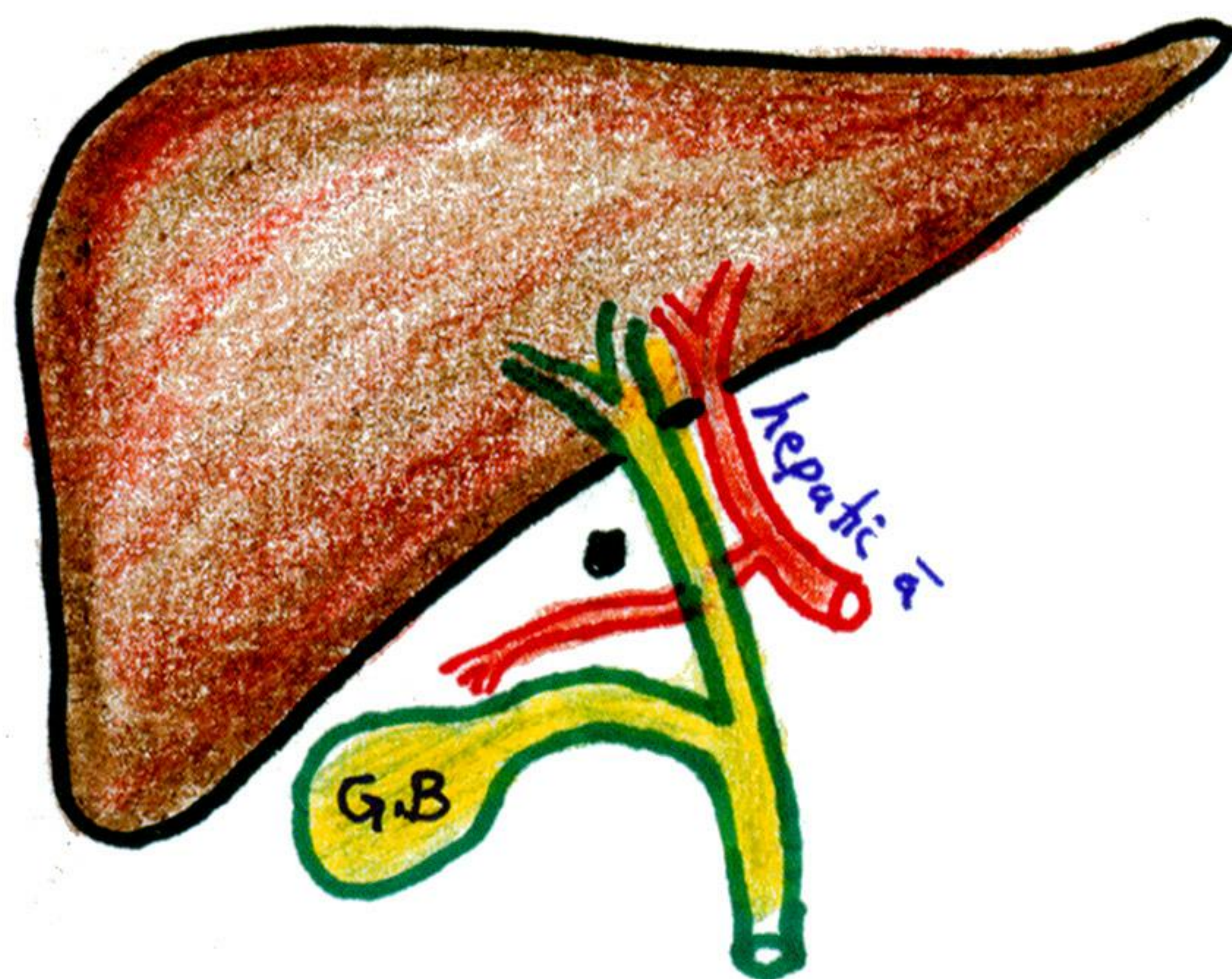
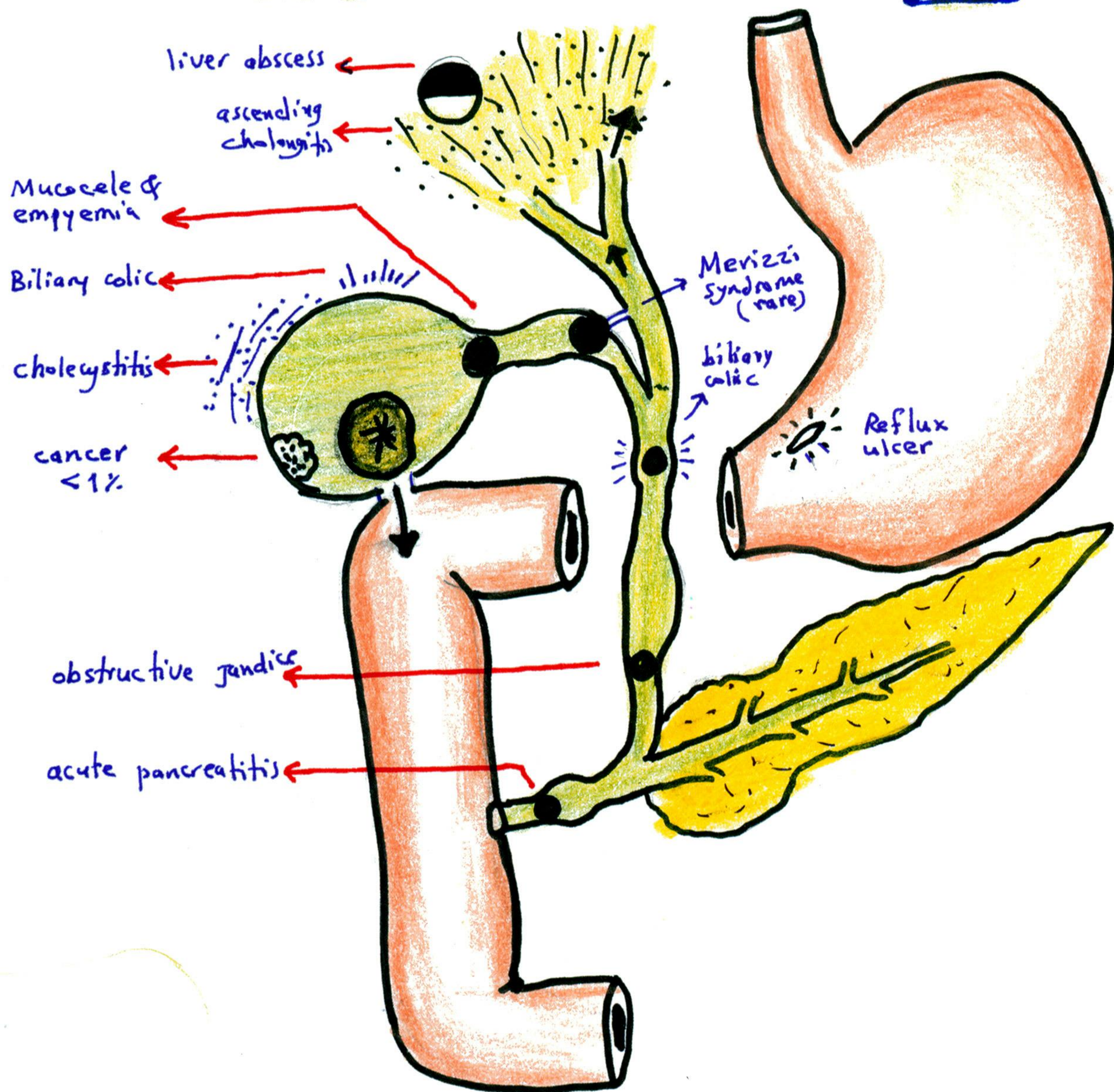
- GB carcinoma may develop by ch. irritation (< 1%).

* Clinical Picture:-

- ① May be Asymptomatic (Silent stone)
- ② Symptomatic
 - A → recurrent attack of biliary colics :-
 - Pain [Rt hypochondrial, radiated to Rt shoulder, associated @ N&V, ↑ by fatty meal, ↓ by drug]
 - tenderness +ve Murphy's sign. if @ cholecystitis
 - B → s/s of complication
 - cholecystitis
 - obst. jaundice

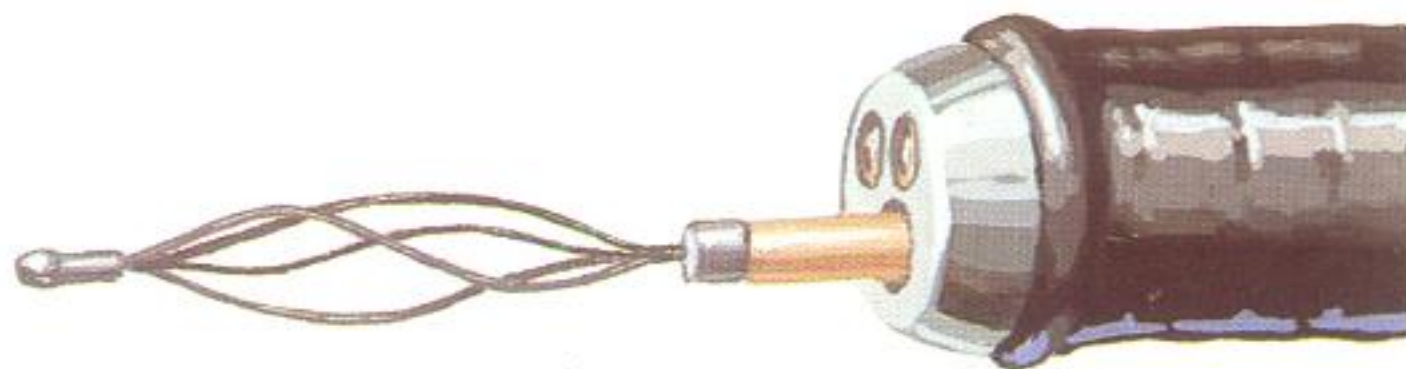
Saint's triad = ① Ch. calculous cholecystitis ② Hiatus Hernia ③ Diverticulosis coli

Gall stone complications



Calot's triangle:-

- Boundaries:-**
 - cystic duct
 - Common hepatic duct
 - inferior border of liver
- Contents:-**
 - ①-cystic artery
 - ②-Mascagni's (or lund's) lymph node.
 - ③-accessory right hepatic artery or bile ducts



Dormier basket in
closed position

Flexible
choledochoscope



Dormier basket in
open position

Catheter

* Investigations :- of Biliary system

① Abdominal ultrasound (USS) :- (1st invest.)

easy
simple
inexpensive
informative
Non invasive

- * Can detect
- GBS in 98% of cases (difficult to detect CBD stone)
 - thick GB wall (in chronic cholecystitis)
 - Double wall GB "pericystic oedema" (in acute ch.itis)
 - Dilated extrahepatic & intrahepatic bile duct as in CBD stone $\rightarrow$ dilated CBD $> 1\text{cm}$ (N $0.8-1\text{cm}$ $8-10\text{mm}$)
 - Distended GB $\rightarrow$ mucocele. empyemia.
 - masses in porta hepatis or head of pancreas.

② Plain X-ray :- (limited value) :-

- * Can detect
- GBS in 10-15% of cases
 - Calcified GB wall (Porcelain G.B).
 - Air in GB (in acute emphysematous cholecystitis)
 - Air in biliary system (in choledcho-duodenostomy or sphincterotomy operations).

③ Oral cholecystography (OCG) :-

- * Can detect • GBS even radiolucent (filling defect)

* Method :- fasting pt (12 hr) takes the contrast material orally (telepaque = 6 tablets) $\rightarrow$ concentrated in gallbladder^{GB} and x-ray taken, another one taken after pt given fatty meal (to see contraction if good by shrinked GB to about $\frac{1}{3}$ its size)

* Advantage :- (was invest of choice but now replaced by USS)
- used in Biliary dyskinesia (assess contraction of GB).

④ ERCP = (Endoscopic Retrograde Cholangio pancreatography) :-

* Method :- upper GIT endoscopy passed, catheter inserted into duodenal papilla (ampulla of Vater), both CBD & pancreatic duct visualised by contrast material.

- * Indications :-
- Detect CBD stone & Pancreatic duct stone (filling defect)
 - Detect ^{& treat} missed stone in CBD after cholecystectomy.
 - Diagnosis of cancer head of Pancreas & take biopsy from lesion in ampulla of Vater
 - Visualize Pancreatic duct (Pancreatitis, Pseudocyst, -- etc)
 - Detect biliary duct stenosis.

* advantage :: ERCP is diagnosis & may be therapeutic.

• Therapeutic procedures of ERCP are:-

① inserting stent in CBD to drain malignant obst. ^{CBD}

② treatment of CBD stone by

- sphincterotomy → at 10 O'clock to avoid injury to panc. duct
- Dormia basket.
- Litho tripsy (crushing)
- Irrigation.

* precautions :- before doing ERCP need

coagulation screen
vit K (IM) long/day
antibiotic prophylactic
rehydrate pt

* Complications :- cholangitis ^{1-3%}, acute pancreatitis ^{1-4%}, septicemia, ^{2-9%} duodenal perforation may occur, bleeding

⑤ MRCP :- (Magnetic resonance cholangio Pancreatography) :-

* Advantage :- non-invasive (computerized discoloration of bile)

- Can visualize biliary system without need for contrast material.

* disadvantage :- expensive & diagnostic only (not therapeutic).

⑥ PTC :- (Percutaneous Transhepatic Cholangiography) :-

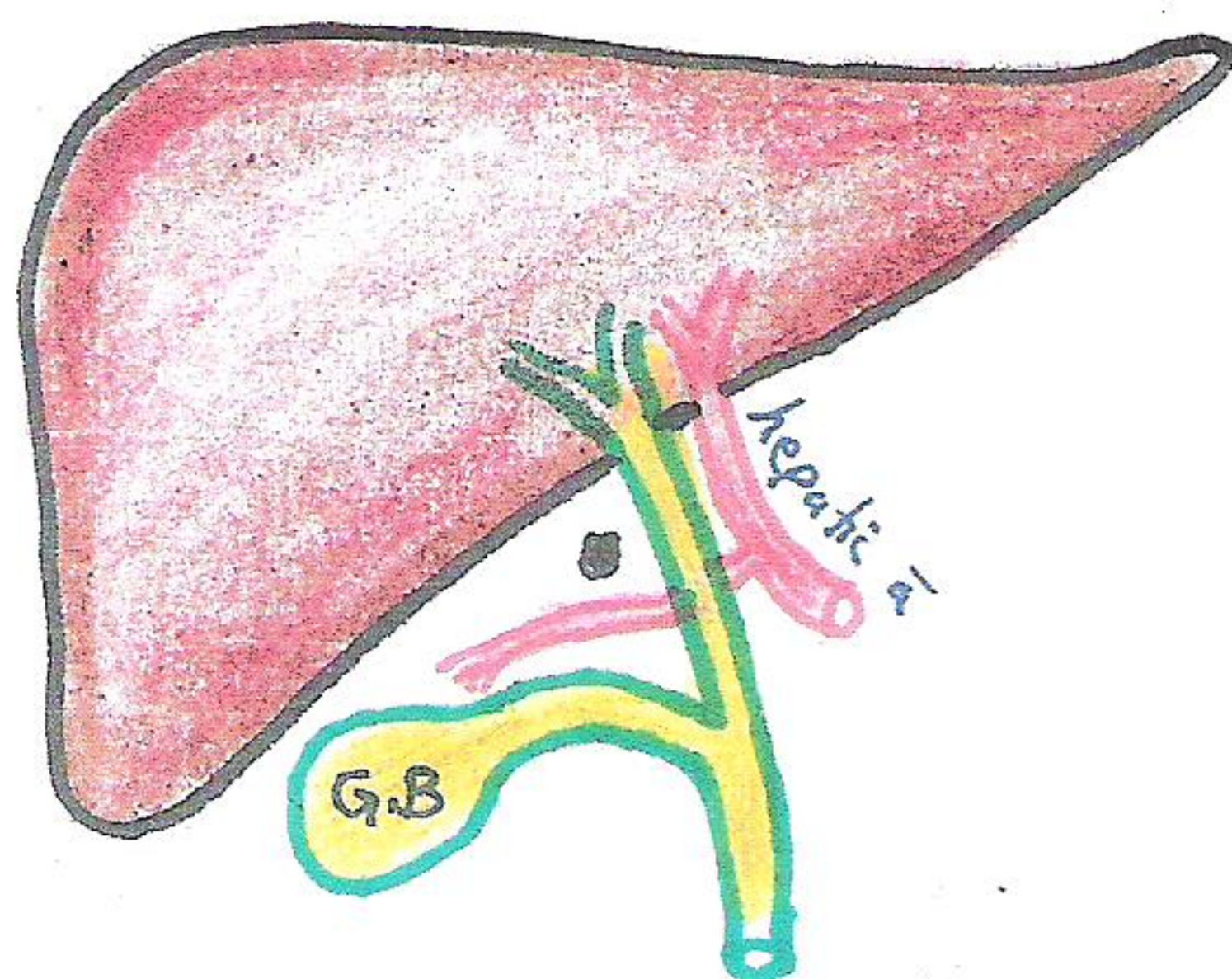
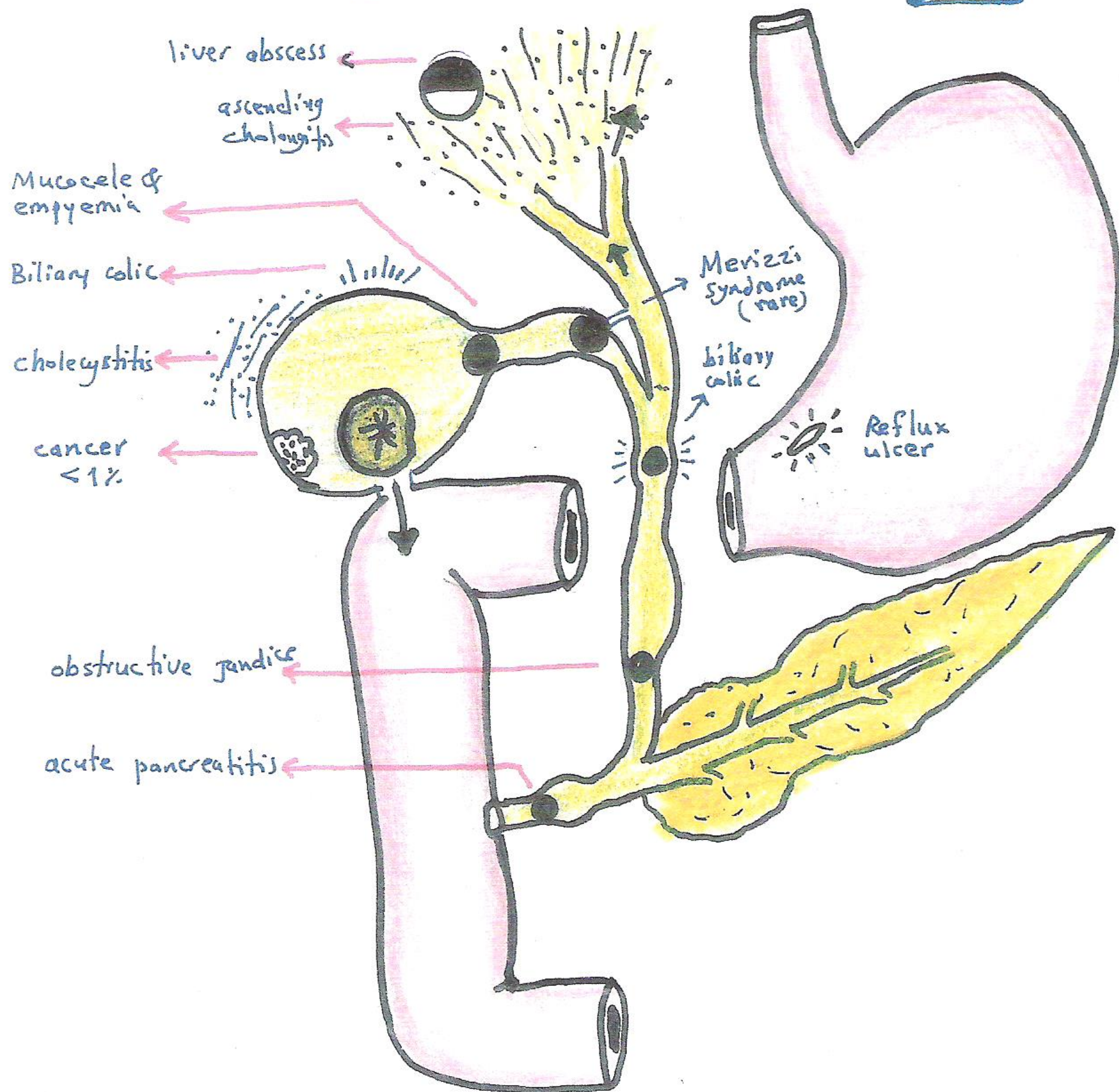
* Method :- under LA, a thin cannula (chiba needle) introduced in 8th intercostal space into liver with suction until bile comes out (better by USS guide) then inject contrast material.

* Precaution :- before doing PTC look coagulation & must do USS to see dilated intrahepatic ducts.

* Indications :- • Diagnosis of high obstruction of bile ducts. as stone, in Post-op. stricture, hilar cholangiocarcinoma
• External drainage of bile. (if bilirubin > 20 mg%)

* complications :- bleeding, infection, biliary peritonitis.

Gall stone complications



Calot's triangle:-

- Boundaries:-
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- Contents:-
 - ①- cystic artery
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 - ③- accessory right hepatic artery or bile ducts

⑦ HIDA scan (Hepatic Imino Diacetic Acid isotope scan)

* Method:- Tc^{m99} labelled derivative of iminodiacetic acid (HIDA) is injected I.V $\rightarrow$ rapidly excreted by liver.

* Indications:- Diagnosis of acute cholecystitis (if GB not visualized indicate acute ch. by neck ^(stone) obstruction) (if fills exclude)

- Diagnosis of congenital biliary atresia.
- visualization of a biliary enteric anastomosis.

⑧ Others:-

- Intraoperative cholangiography (during removal of GB to detect missed CBD stone).
- T-tube cholangiography: to detect missed CBD stone after cholecystectomy & CBD exploration.
- CT-scan :- detect mass (malignancy) in liver, pancreas... etc
 - pancreatic pseudocyst
 - acute pancreatitis (thick - oedematous pancreas).
- Barium meal - (not used now a days)
 - Widening of duodenal curve (Pad sign) $\rightarrow$ cancer head pancreas
 - Inverted 3 shaped $\rightarrow$ Periapillary carcinoma

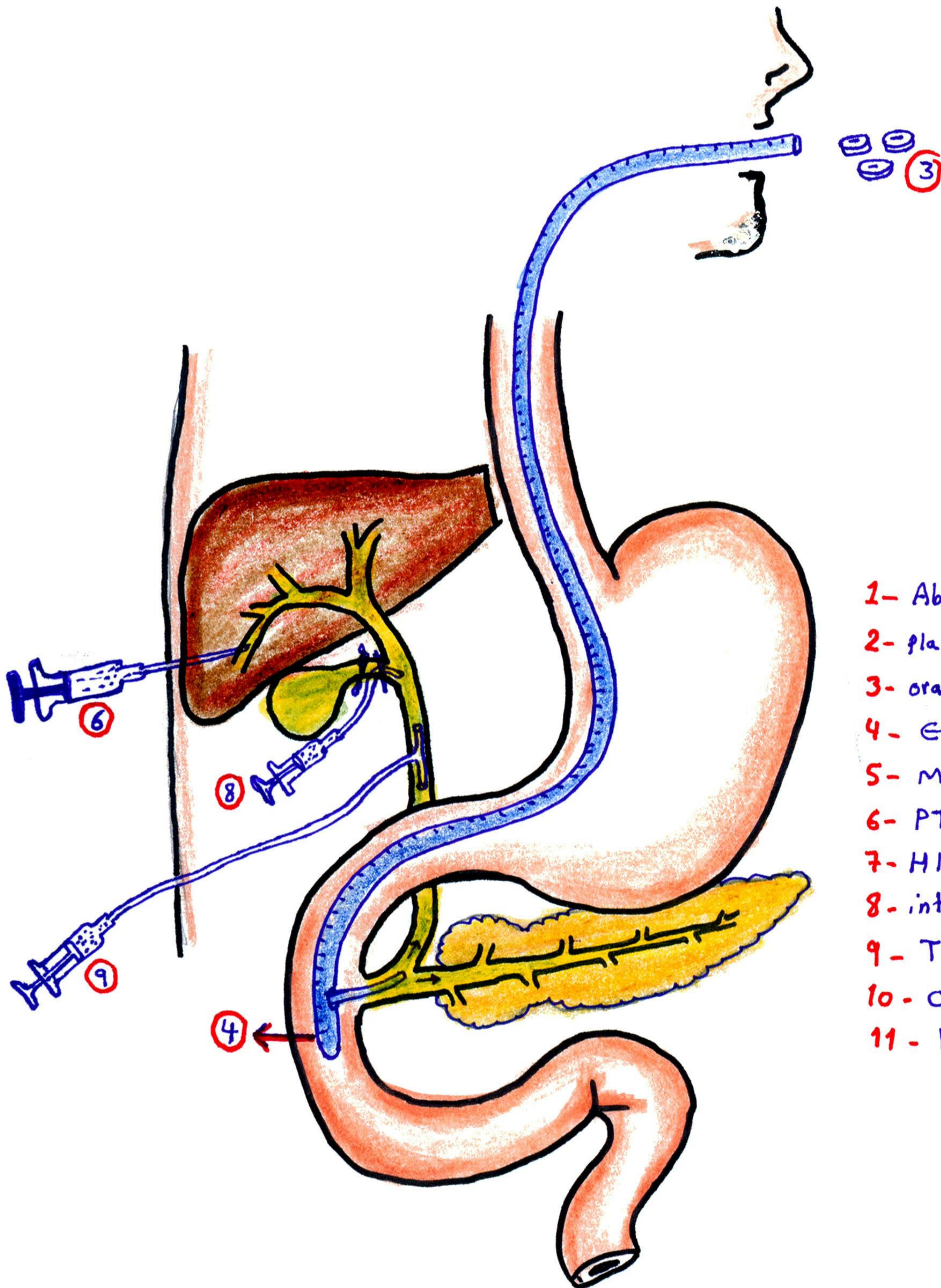


NB:- The most & 1st investigation done is USS.

- others done are ERCP. MRCP

NB - GBS may be silent and discovered accidentally during abdominal USS for other pathology.

Investigations of biliary system



- 1- Abdominal US
- 2- plain x-ray
- 3- oral cholecystogram (ocg)
- 4- ERCP
- 5- MRCP
- 6- PTC
- 7- HIDA scan
- 8- intraop. cholangiogram
- 9- T. tube " "
- 10- CT scan
- 11- barium meal.

(I) Silent GBS :- (contraversal) :-

- young pt or fit → cholecystectomy to avoid future complications especially if diabetic pt or sickle cell.
- old pt or unfit → follow up.

(II) Symptomatic stones :-

- Do cholecystectomy either open or laparoscopic.
- Treat complication accordingly.

* Advantage of laparoscopic cholecystectomy :-

1. Less postoperative pain
2. less hospital stay & early return to work.
3. Better cosmetic result

* Disadvantage of lap. chole. :-

1. Can not deal with CBD stone perfectly. need trained Dr.
2. may be contraindicated in some patient

* Contraindications of lap chole. :-

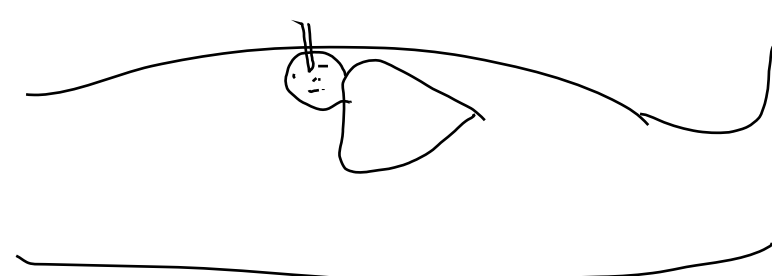
1. Marked obesity (difficult).
2. Pregnancy.
3. bleeding tendency
4. Liver cirrhosis.
5. empyema GB & GB carcinoma.

6. previous surgery (adhesions)

7. Compromise of Cardiovascular or resp. function.

NB :- Medical ttt of GBS by chenodeoxy cholic acid appear in 1980s but NOT USED nowadays.

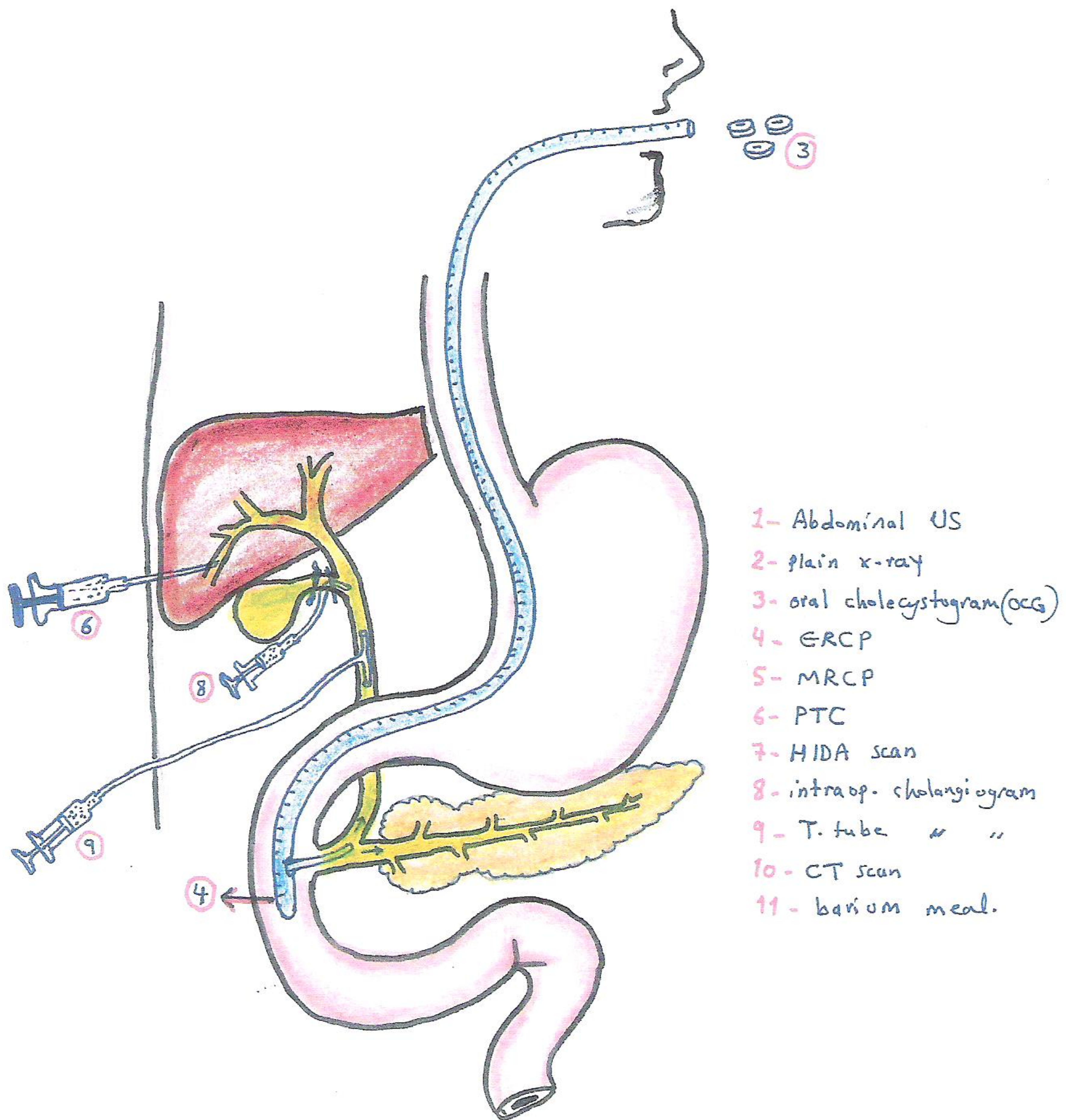
Embyemia of gall bladder is treated by cholecystostomy then later cholecystectomy



URO (4-4) (3 1/2 - 1 1/2) (1 - 11)

A — Acromegaly
R — Rhe. arth.
M — Myxoedema/pulmo.
P — Pregnancy
I — Diabetes
T — Trauma / wound

Investigations of biliary system



CBD STONES

* Cholelithiasis

* Incidence :-

- CBD stones are found in 10-15% in all pt with G.B.S
- can be single or multiple. , [60% are cholesterol, 40% are pigment]

* Types :-

- ① Primary CBD stones: (rare): in absence of GBS. (formed in CBD).
- ② Secondary CBD stones: formed in GB & passes into CBD.

* Clinical Picture :-

- May be a symptomatic or pain in RH radiating to R shoulder
- s/s of ^{obst.} jaundice (pale stool, dark urine, itching,etc)
- the obstructive jaundice may be intermittent. /charcot Δ, Renyold's pentad.

* Investigations :-

- Laboratory :- CBC (↑WBC), ↑ s. bilirubin, ↑ s. alk. phosphatase... etc ^{LFT}
- Radiological :- USS, ERCP, MRCP, MRI, PTC, +
- if CBD not dilated may need liver biopsy (intrahepatic cause)

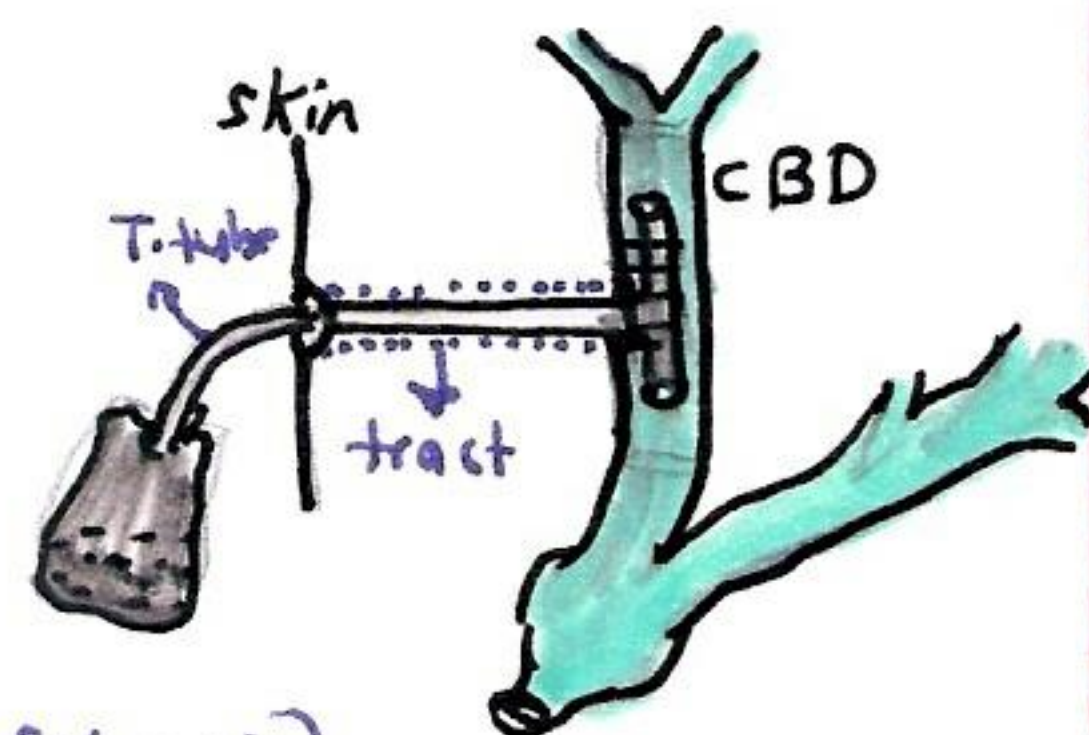
* Treatment :-

- ERCP : by sphincterotomy, dormia basket,etc.
- Surgery (rarely used nowadays) by CBD exploration
- ① choledocho-duodenostomy if stone > 2cm ② transduodenal sphincteroplasty < 2cm ^{common used}

CBD EXPLORATION :-

- * Indications :- if failed ERCP
- Palpable CBD stone during open cholecystectomy that not removed by milking or other procedure
- * Procedure :- CBD opened longitudinal and stone removed with forceps or Fogarty ^{balloon} catheter and further check intraoperative cholangiogram is obtained

- CBD opened longitudinal because
 - less injury to B.V
 - can extend incision
 - less stricture
- T-tube inserted in CBD & long arm of T brought out side abdomen (drain).
- T. tube indicated in ① CBD exploration, ② dilated CBD and to ③ prevent fibrosis of CBD ④ to drain bile.
- T. tube must left for 7-10 days to form tract around it so that can be removed without leaking CBD, before removing the t-tube check cholangiogram must be done (retained stone)
- T. tube advantage are:
 - 1- to prevent stricture of CBD (fibrosis)
 - 2- Dx of missed stone (by T. tube cholangiography)
 - 3- ttt of missed stone (by irrigation, ERCP, wire, domain basket)



Absolute indications for CBD exploration are A/E

1. palpable stones in CB
2. jaundice with cholangitis
3. stone visualized at intra op cholangiography
4. dilated and thickened CBD

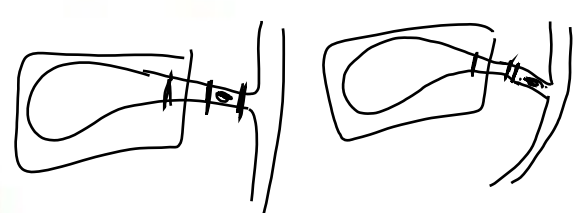
Other relative indications are:

1. H/O intermittent jaundice or biliary colic
2. when on aspiration the bile is white
3. previous H/O pancreatitis

Complications of Laparoscopic Cholecystectomy

Early complication:

- Ø Common bile duct injury
- Ø Bile leak
- Ø Injury to viscera
- Ø Hemorrhage
- Ø Retained stones and abscess formation



Late complication:

- Biliary strictures
- Cystic duct clip stones
- Hemorrhage

CHOLECYSTITIS

ACUTE CHOLE.

* Definition & causes :

- Acute inflammation of G.B.
 - Caused by :- ① Stone obstructing cystic duct or neck of G.B (95%) and called Calcular cholecystitis.
 - ② bile stasis
 - ③ bacterial
 - ④ pancreatic juice irritation
- (5%) → A calcular cholecystitis

* Pathology :-

- obstruction of cystic duct or neck of G.B by ston → G.B distention, oedema & inflammation.
- If remains sterile → mucocele & if 2nd infected → cholecystitis and empyema of G.B

* Clinical Picture : more in female (30-80 age) (5f).

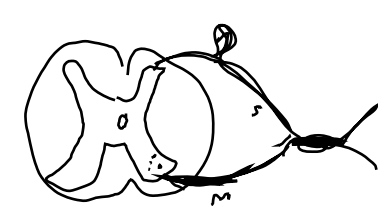
- ① - Pain (Biliary colic) in upper abdomen & right hypochondrial, colicky then dull then persistent, radiat to R. shoulder associated with nausea & vomiting.
- ② - fever, tachycardia.
- ③ - Murphy's sign (+ve), Boas sign → (area of hyperaesthesia between 9th & 11th ribs posteriorly in Rt side)

S O C R A T
Site Onset Characteristic Radiat Aggravated Relieved

20/11/22

* D/D :-

- ① Peptic ulcer (Perforated)
- ② Pancreatitis, gastritis, duodenitis
- ③ Hepatitis, appendicitis
- ④ M.I.
- ⑤ basal pneumonia
- ⑥ Herpes Zoster



CHRONIC CHOLE.

* Definition & causes:-

- Symptoms of acute cholecystitis for > 2 wk
- Caused mainly by stone (ch. calculous cholecystitis) but may by (non-calicular) by typhoid, biliary dyskinesia, etc

* Clinical Picture:-

- Moderate intermittent pain in epigastric region, RHP radiating to R- shoulder & between scapulae, associated with N & V, aggravated by fatty meal and so that called "Fatty dyspepsia"

* Treatment:

- Medical ttt (not done nowadays) by
 - Oral bile salts (2 years) 13% successful
 - Lithotripsy (need functioning G.B)
- Surgical ttt - elective cholecystectomy (lap. or open).
 - Emergency (if complicated).

NB:- 75 % of pt $\rightarrow$ symptoms relieved post-cholecystectomy
 25% of pt $\rightarrow$ develop post-cholecystectomy complications
 15%

* Post cholecystectomy syndrome:

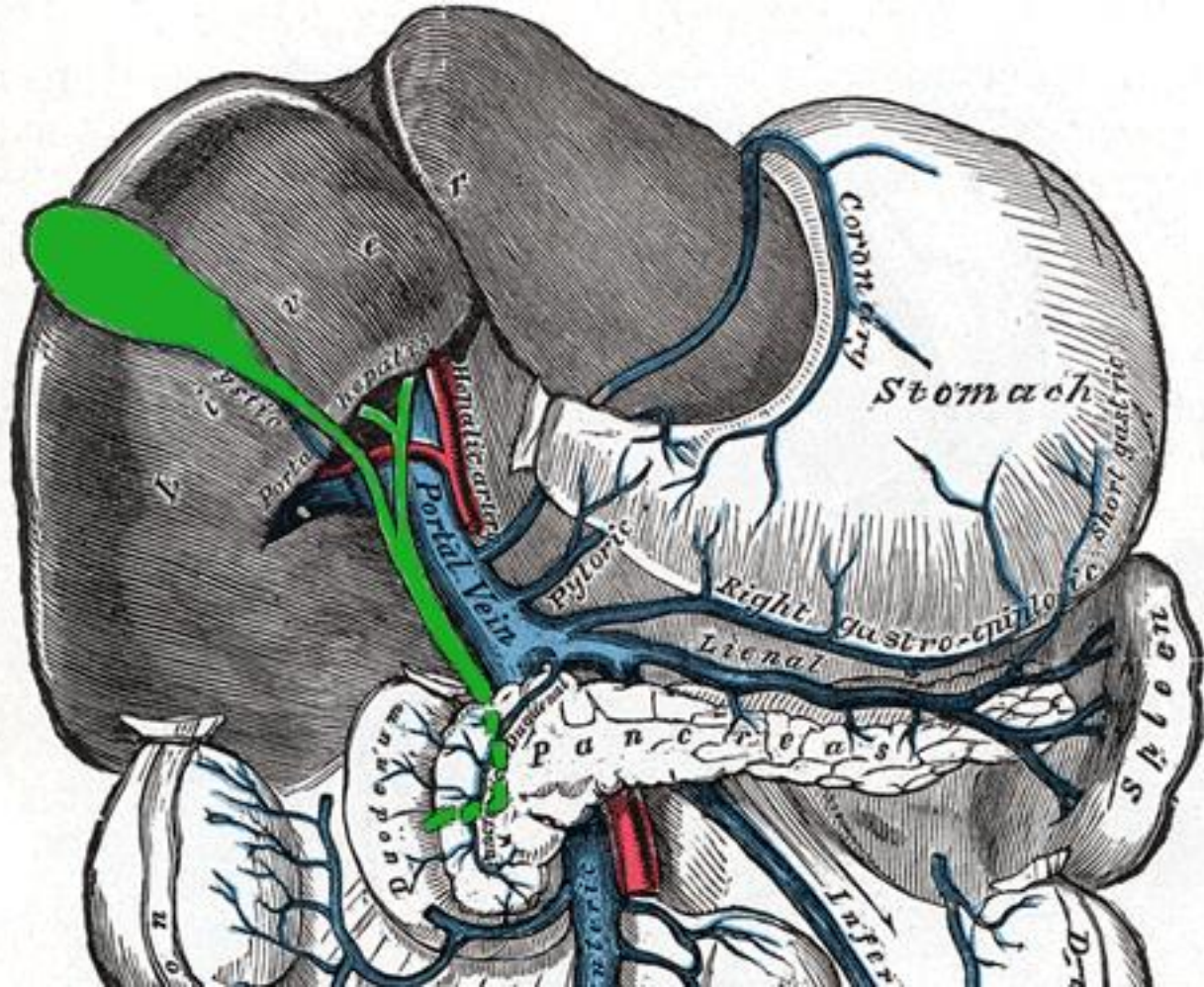
- It is persistence of s/s of cholecystitis after cholecystectomy

- Causes (A) Biliary causes:

- 1- CBD stone
- 2- stenosis of sphincter of oddi
- 3- Biliary stricture
- 4- stone in cystic duct stump

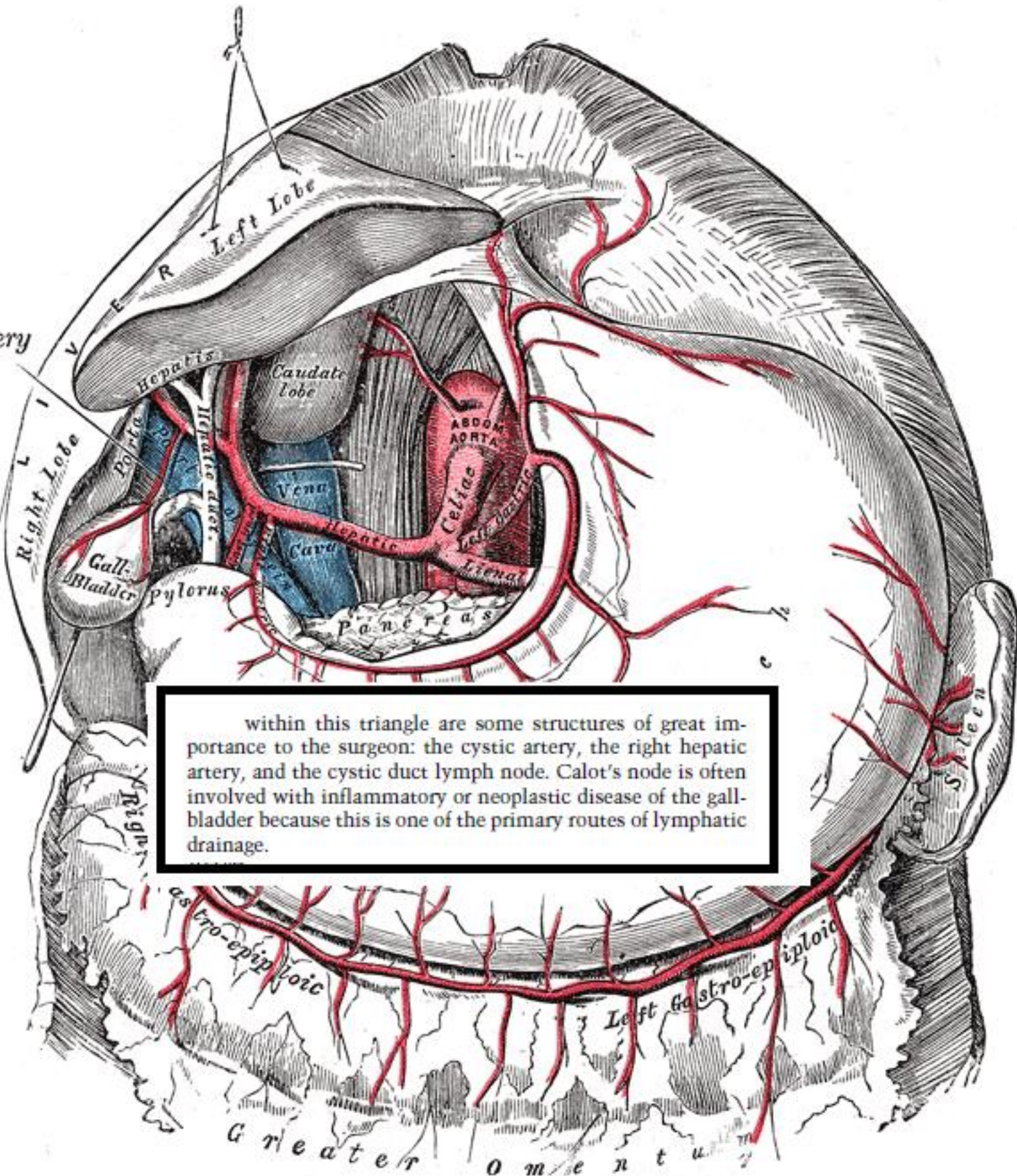
(B) Extra biliary causes:

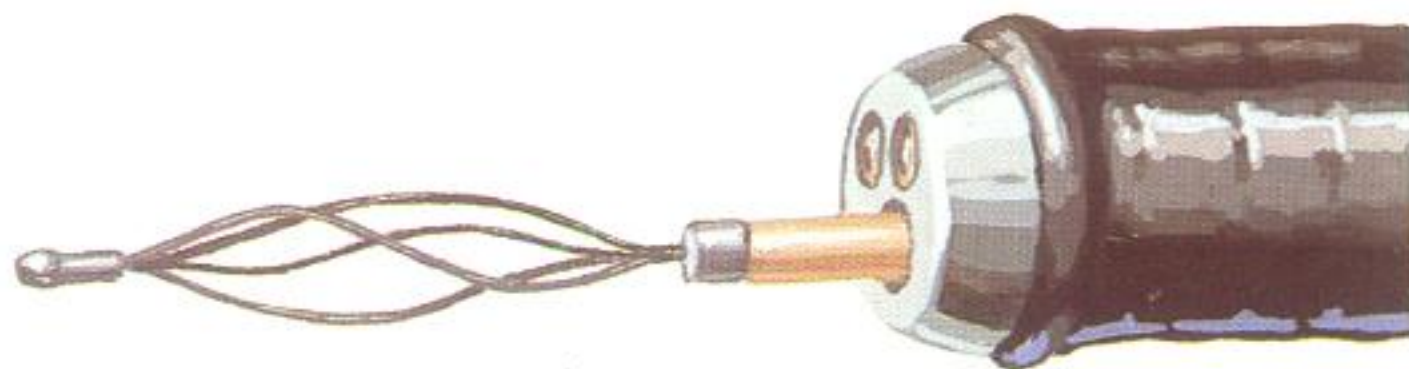
- 1- hiatus hernia
- 2- peptic ulcer
- 3- pancreatitis
- 4- irritable bowel syndrome
- 5- food dyspepsia (high fat diet).



Cystic artery

Probe passed through epiploic foramen





Dormier basket in
closed position

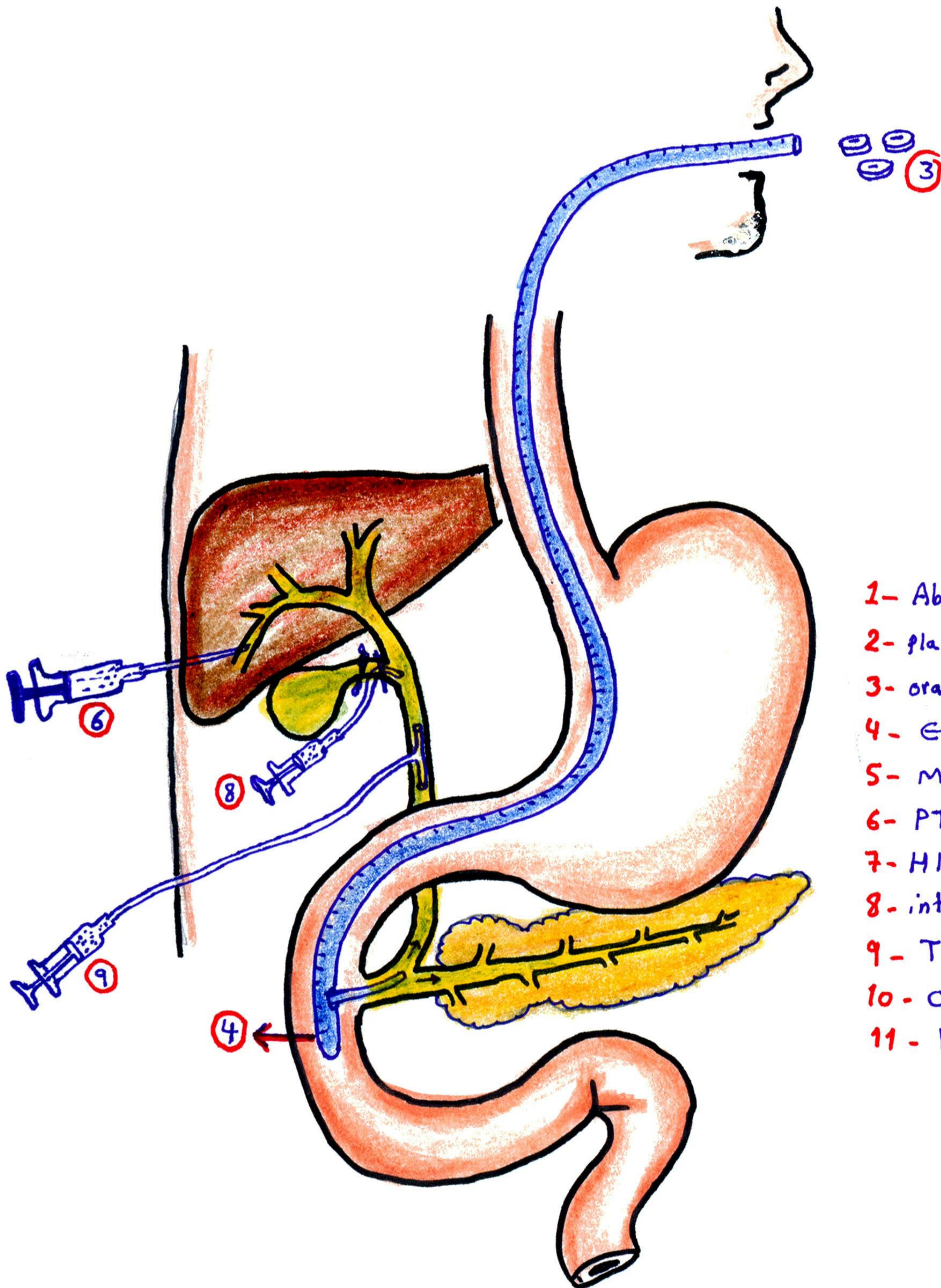
Flexible
choledochoscope



Dormier basket in
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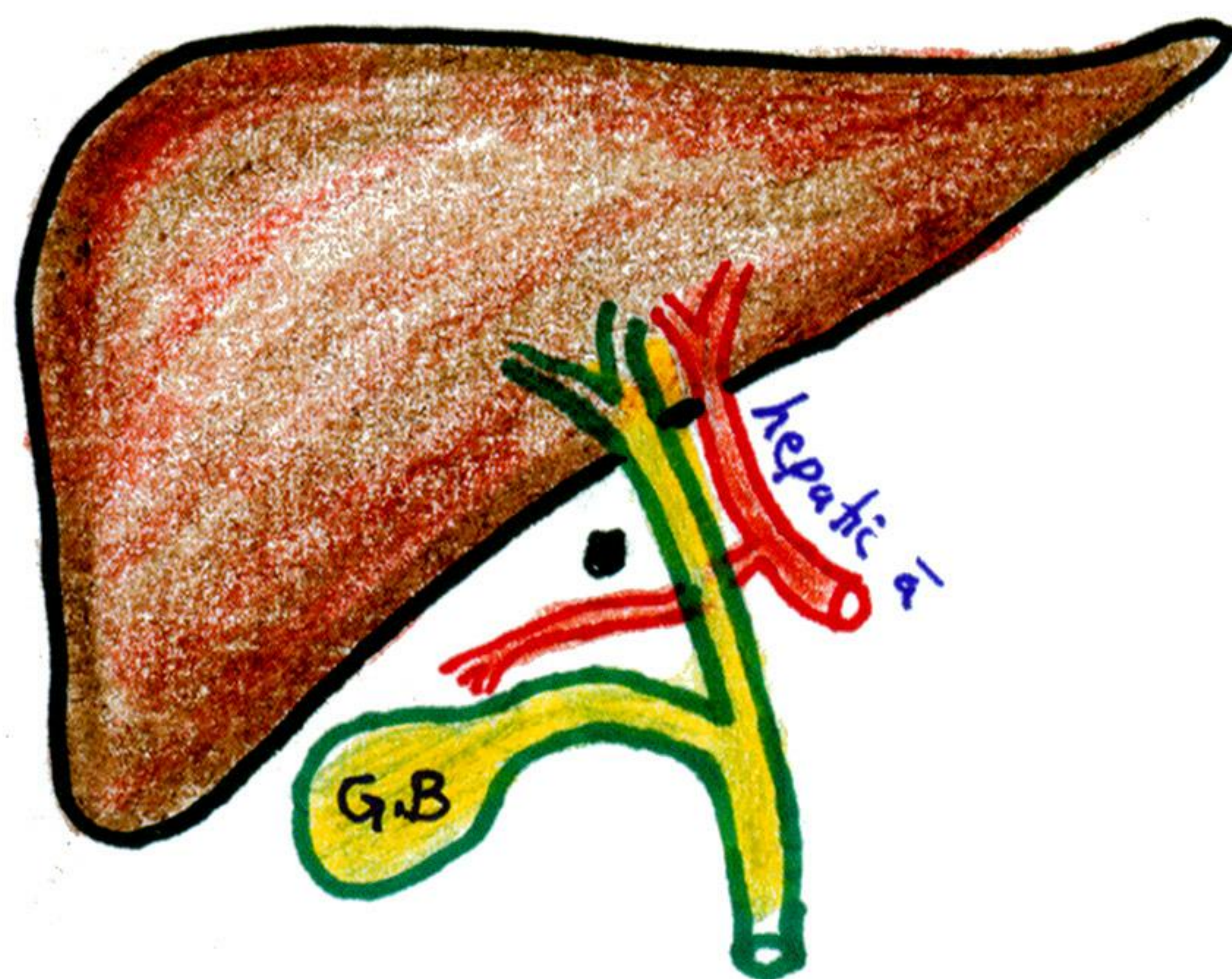
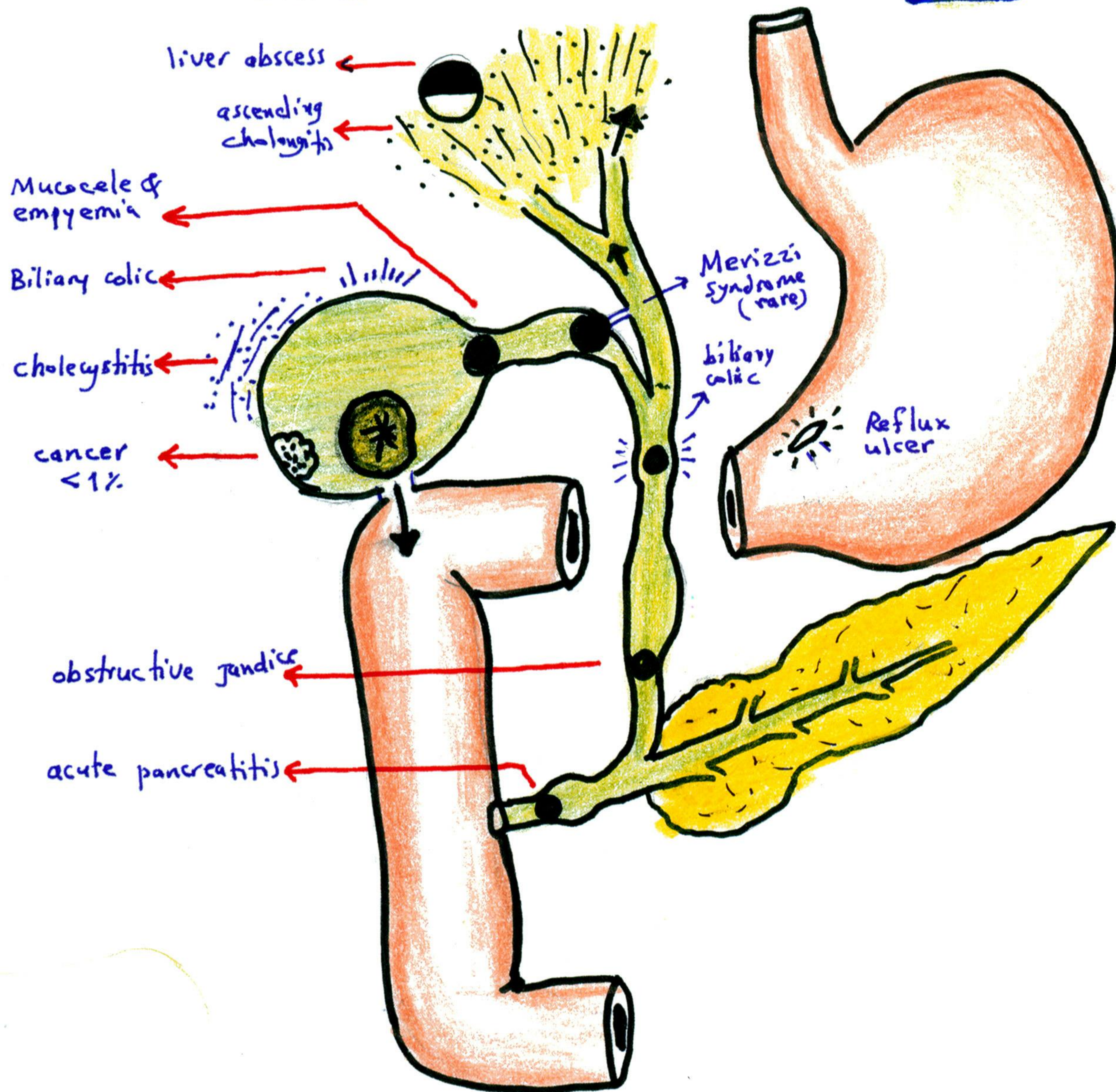
Catheter

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